

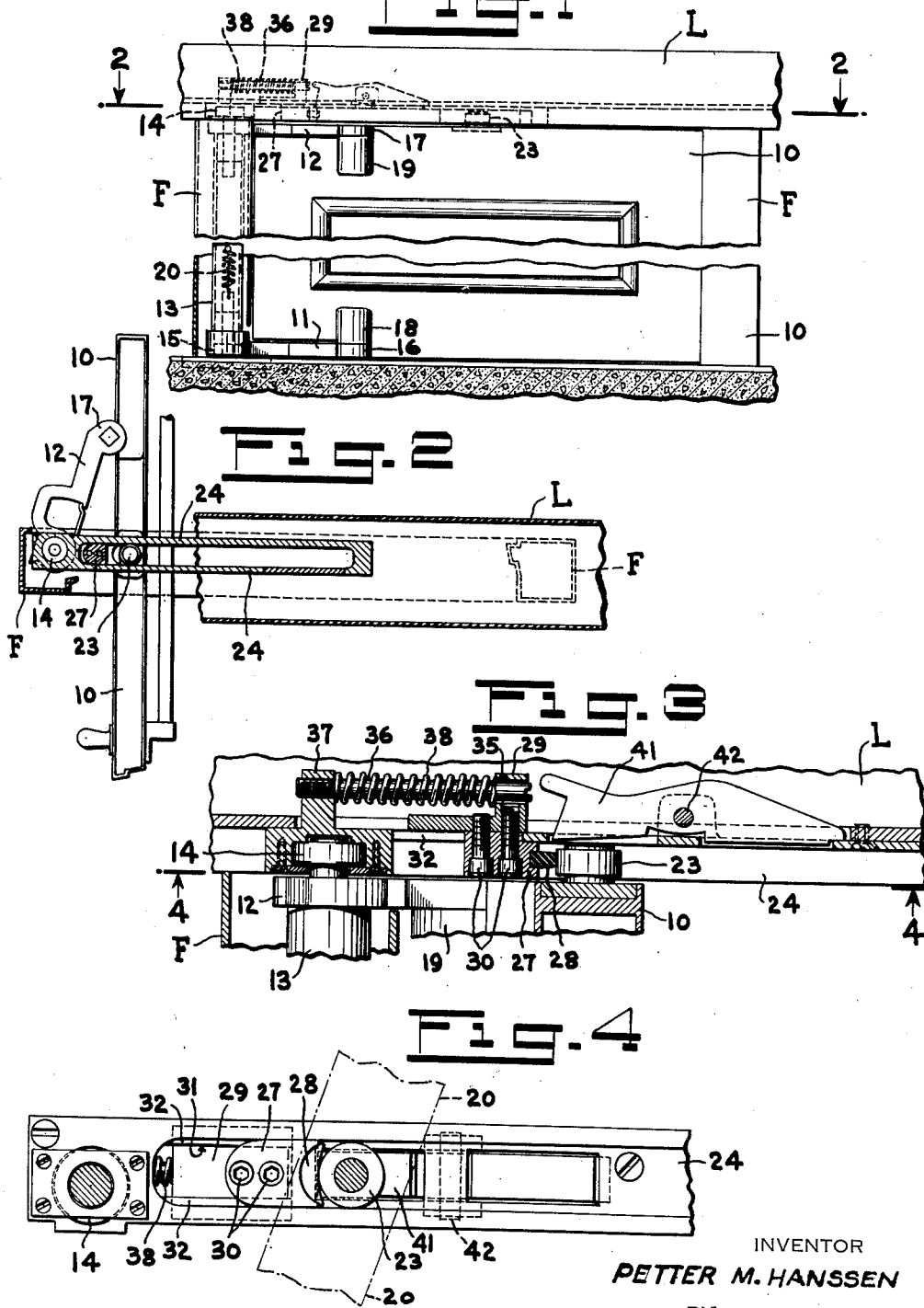
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BALANCED DOOR

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2,637,877

BALANCED DOOR

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The invention relates to a balanced door organization such as that illustrated and described in the Ellison Patents 2,019,526, 2,019,527, and 2,019,528. The balanced door organizations of the patents show a bumper spring within the door check mechanism for resisting movement of the door when it approaches full open position. In other words the door check piston operates to close the door slowly when the door has reached approximate closed position and the bumper resists further movement of the door when it approaches approximate full open position. The bumper mechanism to be described is an improvement over the bumper mechanism associated with the door check and also enables the use of a smaller and less expensive spring.

It is an object of the invention to construct a balanced door organization having a bumper engageable when the door reaches approximately fully opened position which bumper is of simple construction and relatively inexpensive to manufacture.

Another object of the invention is to construct a balanced door organization in which a bumper is provided in the end of the guide channel and is engaged by the guide means or roller carried by the door when the latter approaches the end of the channel.

Other objects of the invention will be more apparent from the following description when taken with the accompanying drawing illustrating a preferred embodiment thereof in which:

Figure 1 is a plan view of the upper and lower portions of the balanced door organizations;

Figure 2 is a top view of a balanced door organization with the door in fully opened position;

Figure 3 is a vertical section through the guide channel and limit bumper for the balanced door; and

Figure 4 is a plan view of the guide channel.

A balanced door organization includes a door 10 which is mounted upon arms, two arms 11 and 12 being shown one of which is located adjacent or at the top and the other adjacent or at the bottom of the door and one end of each arm is mounted for pivotal movement with respect to the door frame. Any suitable mounting may be used as that illustrated including a tube 13 to which each arm is secured and the tube and arm assembly is mounted for rotation within the frame F such as upon bearings 14 and 15, the latter carrying the weight of the door organization. The other end of each arm carries pivotal means 16 and 17 which is received by

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pivot bearings 18 and 19 secured to the door at a point between the vertical edges thereof. A spring 20 normally operates to turn at least one arm in a clockwise direction as viewed in Figure 2 to propel the door towards closed position. The spring shown operates upon the tube 13 so that the spring 20 turns both arms to swing the door to closed position.

The door carries a guide means, shown as a guide roller 23, which is secured to the top edge of the door at a point between the vertical edges thereof and spaced from the pivot means 17. The guide roller is received in a guide channel 24 which is secured to the lintel or cornice L of the door frame. The pivoted arms 16 and 17 and the guide means 23 moving in the guide channel 24 gives the door a combined pivoting and side-wise movement thereof with a portion of the door swinging inwardly of the door frame and another portion swinging outwardly thereof.

Within the guide channel 24 at the end thereof adjacent the pivotal mounting 13, 14 for the arm is a bumper or bumper means 27. The bumper is freely movable with respect to the channel at the end thereof and the movement particularly shown is a sliding movement. The bumper may have a rubber buffer 28 to reduce or eliminate any shock by engagement of the guide roller 23 therewith. The bumper has an extension 29 secured thereto by screws 30 and forming a part of the bumper which extension projects through a slot 31 in the upper face of the channel. The slot forms flanges or shoulders 32 which slidably mounts the bumper upon the channel.

The bumper is propelled to the right as shown in Figure 3 by suitable spring means which is shown as a hole 35 in the extension in which a pin 36 is received and freely slidable. The pin may be secured to a bracket 37 carried by the frame channel or associated structure. The pin is shown as threaded into a bracket. A helical spring 38 is mounted upon the pin so that one end abuts the bracket and the other end abuts the bumper means or its extension 29 to propel the latter in the direction of the channel.

In operation as the door opens the guide roller travels in the channel to the left, as shown in the figures, engages the bumper when the door is adjacent fully open position as shown in Figures 3 and 4 and slides the bumper to the left as shown in Figure 2. This movement is resisted by the spring 38 with the result that it cushions the final opening movement of the door and

avoids or at least minimizes the possibility of the door banging when the latter reaches or approaches fully opened position.

It will be observed also that the bumper spring 33 when compressed, exerts pressure through the bumper means against the guide roller 23 to propel the latter and the door to the right to assist in starting of the closing movement of the door when the door is in a lateral position with respect to the channel. The spring therefore aids the door closing spring 20 in starting the closing of the door by action of the spring upon the guide roller and by a force exerted in alignment with the guide channel. This is one of the reasons that a considerably smaller bumper spring may be used than was necessary with former bumper constructions. The construction also provides one which is simpler and more economically manufactured yet serves as effectively to perform its bumper function. Replacement of a broken bumper spring is also more easily accomplished.

The location of the bumper means at the end of the guide channel 24 does not interfere with the location and operation of a door holding lever 41 mounted upon a pivot 42 which may be depressed into the channel to engage the guide roller 23 when the door is fully opened and hold the door in opened position against the pressure of the springs 38 and 20 to close the door.

This invention is presented to fill a need for improvements in a balanced door organization with bumper. It is understood that various modifications in structure, as well as changes in mode of operation, assembly, and manner of use, may and often do occur to those skilled in the art, especially after benefiting from the teachings of an invention. Hence, it will be understood that this disclosure is illustrative of preferred means of embodying the invention in useful form by explaining the construction, operation and advantages thereof.

What is claimed is:

1. A balanced door organization to be mounted in a door frame comprising a door, at least two arms one located adjacent the top and the other adjacent the bottom of the door, means pivotally mounting one end of each arm to a door frame

including spring means acting on the pivot means to close the door, means pivotally mounting the other end of each arm to the door at a point between the vertical edges thereof, a channel having guiding walls adapted to be mounted on the door frame above the door, a guide means secured to the door and movable in the channel whereby the door is adapted to normally open and close with a compound sliding and swinging movement, a bumper, means movably mounting the bumper in the channel at the end thereof adjacent the arms and engageable by the guide means when the door is adjacent fully open position and spring means resisting movement of the bumper when engaged by the guide means.

2. A balanced door organization as in claim 1 in which the bumper mounting means is a slide carried by the channel.

3. A balanced door organization as in claim 1 including a slot in the channel forming flanges, and the bumper having means slidably engaging the flanges.

4. A balanced door organization as in claim 1 including a pin secured above the channel and in alignment therewith, the spring being helical and mounted upon the pin, and the bumper engaging the end of the spring.

5. A balanced door organization as in claim 1 including a pin secured above the channel and in alignment therewith, the spring being helical and mounted upon the pin, an extension on the bumper having a hole in which the pin is received, and the extension engaging the end of the spring.

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